

# PATENT SPECIFICATION

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**(54) IMPROVEMENTS RELATING TO TUNER ASSEMBLIES FOR MICRO-WAVE CIRCUITS**



(71) We, EMI—VARIAN LIMITED, a British company of Blyth Road, Hayes, Middlesex, do hereby declare the invention, for which we pray that a patent may be

5 granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to tuner assemblies for microwave circuits.

10 When the generation of micro-wave frequencies is required, so-called Gunn oscillators are often used. The resonant frequency of such an oscillator may be determined by a cavity which is tunable by means of a member, for example a sapphire rod, which projects into the cavity, the extent of the projection of the rod into the cavity being variable to adjust the tuning. In one form 15 of tuner assembly, the tuning member is mounted on a tuner screw which can be rotated from outside the cavity by means of a servo motor, the tuner screw being arranged to engage a threaded member or nut carried on a mounting flange which acts as a bearing for the tuner screw, the flange being mounted on the cavity wall.

Oscillators of the kind described may be required for use in situations in which there is a high level of vibration, and this can 30 lead to undesirable changes in the frequency of the oscillator due, for example, to axial movement of the tuner screw within its mounting flange, or lateral movement of the tuner screw in the threaded member or nut.

The object of the present invention is to 35 reduce the disadvantages indicated in the proceeding paragraph. According to the present invention there is provided a tuner assembly for a micro-wave oscillator which 40 comprises a tuner screw which supports a tuning member operative in the cavity and is itself supported in a mounting, and wherein the tuner screw engages a threaded member, 45 the threads of which are resiliently urged into the thread of the tuning screw from one side, so that the threaded member is held

firmly in engagement of the screw whilst the screw is pushed sideways in the mounting, thus substantially eliminating lateral movement.

In order that the invention may be more clearly understood and readily carried into effect, one example thereof will now be described with reference to the drawings accompanying the Provisional Specification in which:—

Figure 1 is in cross section taken on line I—I of Figure 2, of a tuner assembly for a Gunn oscillator, and

Figure 2 is a view looking in the direction of the arrow B in Figure 1.

Referring to the drawing, reference 1 denotes a sapphire tuning rod for the cavity of a Gunn oscillator. The tuning rod 1 is carried by a tuner screw 2 mounted in two dry film lubricated bearings 3 and 4, one at each end of the tuner screw, on a mounting flange 5, which is secured by screws 6 to the wall 7 of the cavity. The thread of the tuner screw is denoted diagrammatically by the reference 8. A drive shaft 9 is provided to rotate the tuner screw, being coupled thereto by a drive pin 10.

When the screw is rotated, it displaces the tuning rod 1 in the cavity by reason of engagement of the thread 8 with the thread of a half-nut 11 which is positioned within a slot 12 in the mounting flange 5. As shown, the thread of the half-nut can be engaged with the thread of the screw 2 to an extent sufficient to take up any back-lash. A side thrust is imparted to the half-nut by means of a spring 14, in the form of a split ring. The spring is fitted in a slot 15 in the head of a spring adjusting screw 16, and into a slot 17 in the mounting flange diametrically opposite the screw 16.

With the tuner assembly described adjustment of the frequency of the oscillator is achieved by rotating the drive shaft 9 and thereby rotating the tuner screw 2. However, any play of the tuner screw, whether axial or lateral, and of the tuning rod 1 is substan-

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sideways in the mounting, thus substantially 25

2. An assembly according to Claim 1 in which the threaded member is a half-nut slide in a slot in the mounting plate.

Furthermore the sideburst assists in tuning. Furthermore the tuning adjustment when the assembly is subjected to vibration e.g. in a 4. An assembly according to Claim 3, in a

**WHAT WE CLAIM IS:**

1. A tuner assembly for a micro-wave oscillator which comprises a tuner screw against which a screw acts on said member.
2. An adjustable screw on said member which supports a tuning member operating in the cavity and is itself supported in a tuner screw.

which are resolutely urged into the thread of  
the professional member, the threads of

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PROVISIONAL SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale.*

FIG. 1

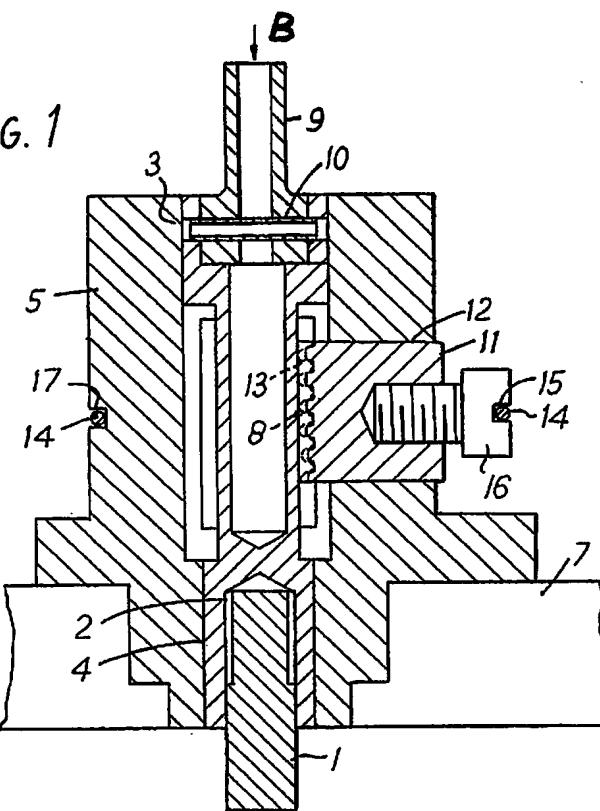


FIG. 2

